Noosa Mining & Exploration
Investor Conference
July 2018



ASX: TMT, TMTO; FRA: TN6

# Leading the Charge in the Vanadium Industry

Aiming to be the Next Producer in an Evolving Market

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#### **Competent Person's Statement**

The information in this presentation that relates to Exploration Results are based on information compiled by Mr Ian Prentice. Mr Prentice is Managing Director of the Company and a member of the Australian Institute of Mining and Metallurgy. Mr Prentice has sufficient experience relevant to the styles of mineralisation and types of deposits which are covered in this presentation and to the activity which they are undertaking to qualify as a Competent Person as defined in the 2012 edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code"). Mr Prentice consents to the inclusion in this presentation of the matters based on his information in the form and context in which it appears.

The information in this report that relates to Mineral Resource estimates is based on information compiled by Mr Aaron Meakin has sufficient experience relevant to the styles of mineralisation and types of deposits which are covered in this report and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code"). Mr Meakin consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.

The information that relates to Ore Reserves is based on information compiled by Mr Daniel Grosso and reviewed by Mr Karl van Olden, both employees of CSA Global Pty Ltd. Mr van Olden takes overall responsibility for the Report as Competent Person. Mr van Olden is a Fellow of The Australasian Institute of Mining and Metallurgy and has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration, and to the activity he is undertaking, to qualify as Competent Person in terms of the JORC (2012 Edition). The Competent Person, Karl van Olden has reviewed the Ore Reserve statement and given permission for the publication of this information in the form and context within which it appears.

The information in this report that relates to the Processing and Metallurgy for the Gabanintha project is based on and fairly represents, information and supporting documentation compiled by Damian Connelly who is a Fellow of The Australasian Institute of Mining and Metallurgy and a full time employee of METS. Damian Connelly has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code"). Damian Connelly consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

# Invest in a World-Class Vanadium Development Opportunity



#### Wholly Owned Gabanintha Vanadium Project;

 5.5km strike length of high grade mineralised layered mafic igneous unit – one of the highest grade vanadium deposits in the World

#### Maiden Reserve;

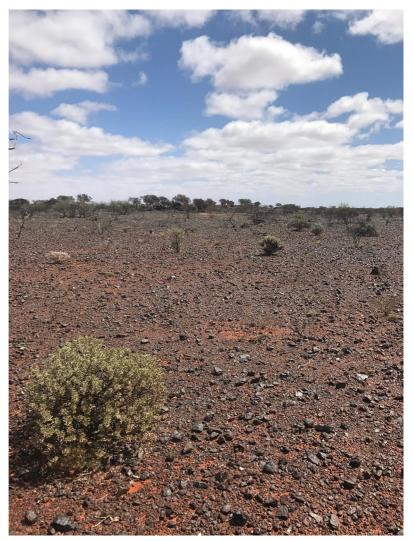
- Probable Reserve of 16.7Mt at 0.96% V<sub>2</sub>O<sub>5</sub> within an Indicated Resource of 21.6Mt at 0.9% V<sub>2</sub>O<sub>5</sub>
- Global Resource of 119.9Mt at 0.8% V<sub>2</sub>O<sub>5</sub> with a high grade core of 55.0Mt at 1.1% V<sub>2</sub>O<sub>5</sub>

#### Emerging Producer;

- PFS based on production rate of up to 13,000tpa of high purity (+99%)
   V<sub>2</sub>O<sub>5</sub> over initial 13 year life
- Rapid payback of <2.5 years including 6 months ramp up period</p>
- Industry competitive operating cost estimate of US\$4.27/lb V<sub>2</sub>O<sub>5</sub>

#### O Global Peer;

 Largo Resources, Inc. (TSX:LGO market cap CN\$923m) operating Maracas Menchen Mine, Brazil, upgrading from ~10,000tpa to ~12,000tpa V<sub>2</sub>O<sub>5</sub>



### **Corporate Overview**

Company Snapshot					
ASX Codes	TMT, TMTO \$2.5m \$34.4m 33.0m 22.5m 55.5m 14.8m				
Est. cash as at end June 2018	\$2.5m				
Market Cap (as at 13 July 2018)	\$34.4m				
Tradeable Shares on Issue 33.0m					
Escrowed Shares on Issue	22.5m				
Total Shares on Issue	55.5m				
<b>Options</b> (\$0.25 – 31/12/19 expiry)*	14.8m				
<b>Options</b> (\$0.35 – 12/01/21 expiry) 3.0m					
<b>Listed Options</b> (\$0.40 – 24/05/20)	6.7m				
<b>Options</b> (\$0.40 – 24/05/20 expiry)**	3.3m				

<sup>\* 22.5</sup>m shares, 13.7m \$0.25 options subject to restriction until 21 December 2018,

<sup>\*\* 3.3</sup>m \$0.40 options vest to eligible employees and consultants on 15 September 2018

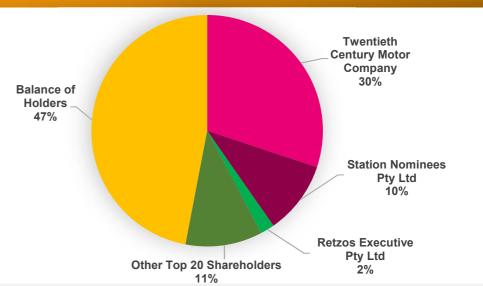
Board of Directors	
Michael Fry	Executive Chairman
Ian Prentice	Managing Director
Sonu Cheema	Company Secretary

"We think there's a revolution coming in vanadium redox flow batteries.....You'll have to get into the mining business and produce ultra-pure vanadium electrolyte for those batteries on a massive scale"

- Robert Friedland, May 2017



#### **Major Shareholders**



ASX: TMT, TMTO; FRA: TN6

# **Experienced Board and Management**





Michael Fry
Non-Executive Chairman

Michael Fry holds a Bachelor of Commerce degree from the University of Western Australia, is a Fellow of the Financial Services Institute of Australasia, and is a past member of the Australian Stock Exchange.

Mr Fry has extensive corporate and commercial experience, financial and capital market knowledge and a background in corporate treasury management.



Ian Prentice
Managing Director

Mr Prentice is a Member of the Australasian Institute of Mining and Metallurgy and holds a Bachelor of Science (Geology) from the University of Western Australia.

Mr Prentice has served as a Director for a number of ASX-listed resource companies, with activities ranging from exploration and project acquisition in Asia and Africa through to gold production in Australia.



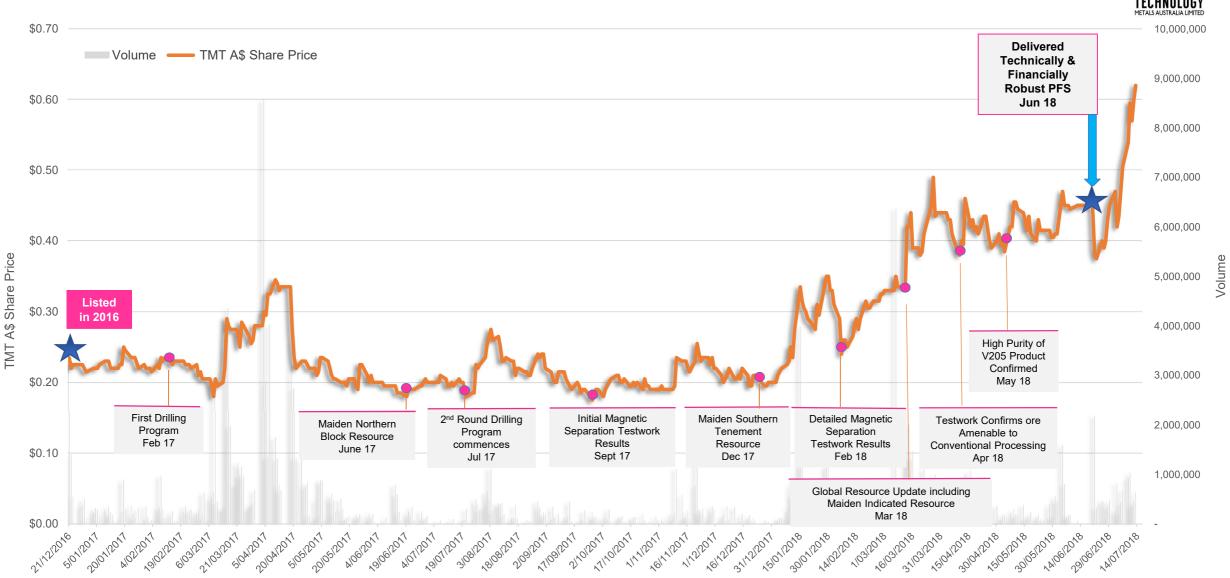
**Sonu Cheema Non-Executive Director and Company Secretary** 

Mr Cheema has completed a Bachelor of Commerce majoring in Accounting at Curtin University and is a member of CPA Australia.

Mr Cheema holds the position of Accountant and Company Secretary for Cicero Corporate Services and has over 10 years' experience working with public and private companies in Australia and abroad.

# Key Milestones Achieved





# Global Vanadium Projects (ex China)



#### TMT at the Right End of the Chart



<sup>3 -</sup> Market capitalisation of listed entities as at 12 July 2018. Bushveld Minerals and Neometals hold other significant resource assets. Vametco 78.8% owned by Bushveld Minerals. Atlantic Limited not listed.

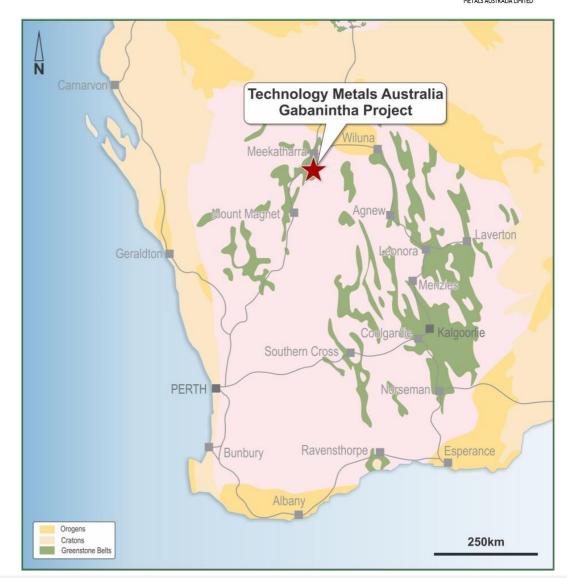
ASX: TMT, TMTO; FRA: TN6



# **Project Overview**

TECHNOLOGY

- 40km South East of Meekatharra in Western Australia.
- Excellent infrastructure sealed Highway from Perth passes within 30km of the project.
- Port of Geraldton 500km to the south west accessible via sealed highway.
- Gas pipeline within 160km.
- Granted tenure with Mining Lease applications in place.
- Global resource of 119.9Mt at 0.8%  $V_2O_5$  including exceptional high grade component of 55.0Mt at 1.1%  $V_2O_5$ .
- Maiden reserve of 16.7Mt at 0.96%  $V_2O_5$  contained within initial Indicated resource of 21.6 Mt at 0.9%  $V_2O_5$ .

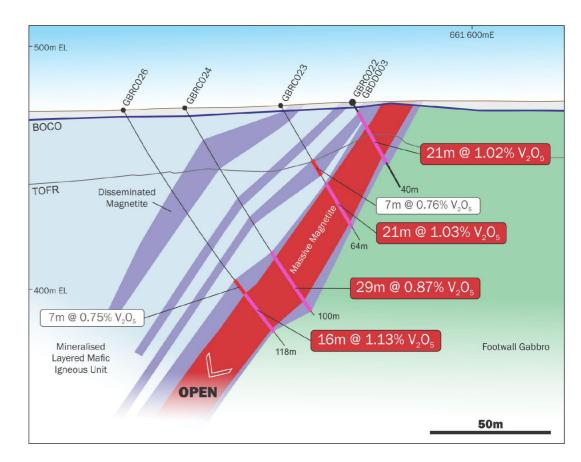


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# **Geological Setting**



- Mineralisation hosted by a layered mafic igneous unit magnetite layers host high grade vanadium and titanium.
- Project contains over 5.5km strike length of the mineralised unit – divided in to Northern Block and Southern Tenement.
- Outstanding consistency of grade and continuity of mineralisation within broad high grade basal massive magnetite zone.
- Mineralisation outcrops along majority of strike length and dips to the west / south west at 55° to 60°.
- High grade basal massive magnetite zone overlain by multiple medium grade zones.
- Mineralisation remains open at depth with high grade zone intersected at in excess of 170m vertical.

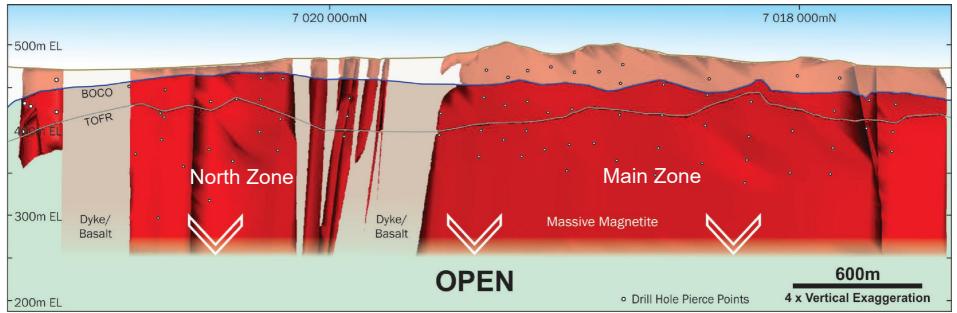


Section 0400N – Wide High Grade Mineralisation with Very Shallow Oxidation Profile

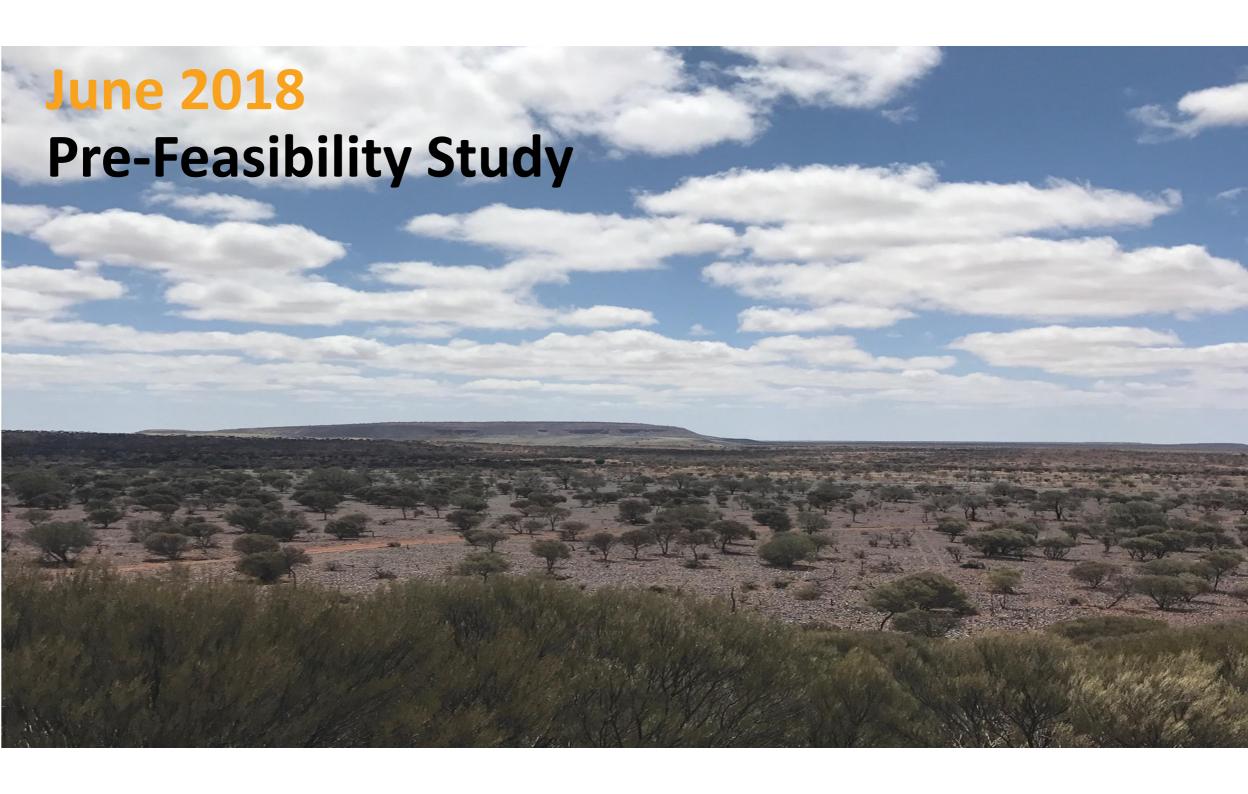
# **Geological Control**



- Northern Block divided into two main zones Main and North.
- Thickening of high grade mineralisation evident in +700m long North Zone along with a significantly shallower oxidation profile.
- Very shallow oxidation profile in North Zone enables early access to transitional and fresh material.
- Southern Tenement appears to have similar very shallow oxidation profile.



Long Section - Northern Block - Massive Magnetite Zone



# Pre-feasibility Study Team

TECHNOLOGY METALS AUSTRALIA LIMITED

- PFS managed and executed by Wave International (Wave) to a confidence level of -15% to +25% with contribution from a range of expert consultants.
- Wave, a resource development / engineering consultant with demonstrated experience in pyrometallurgical process engineering, has had recent experience in the vanadium and battery mineral sector.
- Expert consultants engaged in the PFS include:-
  - CSA Global for resource estimation and mine optimisation / design work.
  - METS Engineering for metallurgical testwork, product assessment and mineral processing, and
  - Integrate Sustainability for environmental, heritage, health, safety and statutory approvals advice.
- Program managed and assisted by TMT geological and processing personnel.







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# Pre-feasibility Study Delivers<sup>2</sup>



Key Metrics	
<b>Probable Reserve</b>	16.7Mt at 0.96% V <sub>2</sub> O <sub>5</sub>
Processing Schedule	19.2Mt at $0.96\% V_2O_5$ (includes 13% Inferred Mineral Resource)
<b>Processing Route</b>	Conventional salt roast / water leach
Initial Mine Life	13 years
Production LOM	~129,000 tonnes V <sub>2</sub> O <sub>5</sub>
Annual Output	$^{\sim}11,700$ to 13,100 tonnes $V_2O_5$ from years 2 to 10
LOM Strip Ratio	5.6:1 across two open pits; North Pit and Main Pit
Production Commencement	Targeting 2021



2 - Refer TMT ASX announcement dated 21 June 2018 for full details of the pre-feasibility study.

# Pre-feasibility Financial Results<sup>2</sup>



Financial Metrics	
CAPEX	~A\$380M (US\$284)
Operating costs	US\$4.27/lb V <sub>2</sub> O <sub>5</sub>
LOM Revenue	A\$4,935m
LOM EBITDA	A\$3,070
Pre-tax NPV (10% discount rate) IRR	A\$1.3bn (US\$958m) 55%
Post-tax NPV (10% discount rate) IRR	A\$850m (US\$637m) 43%
Payback on capital	<2.5 years including 6 months ramp up
US\$:A\$ FX Assumption	0.75
Vanadium Price Assumption*	US\$13/lb V <sub>2</sub> O <sub>5</sub>



<sup>\* -</sup> Source: Merchant Research & Consulting

<sup>2 -</sup> Refer TMT ASX announcement dated 21 June 2018 for full details of the pre-feasibility study.

# Metallurgical Bench Scale Testwork

- Testwork completed on diamond drilling samples.
- Outstanding recoveries of up to 97.8% V in to magnetic concentrate with very high weight recoveries of up to 85.6%.
- Concentrate grades of +1.3% V<sub>2</sub>O<sub>5</sub> for transitional and fresh high grade massive magnetite zone.
- Exceptional rejection of deleterious elements Si and Al results in very high quality magnetic concentrate.
- Downstream testwork focused on conventional salt roast / water leach.
- Final product grades of +99% V<sub>2</sub>O<sub>5</sub> achieved.
- Product expected to be suited to both steel and chemical / VRB industries.

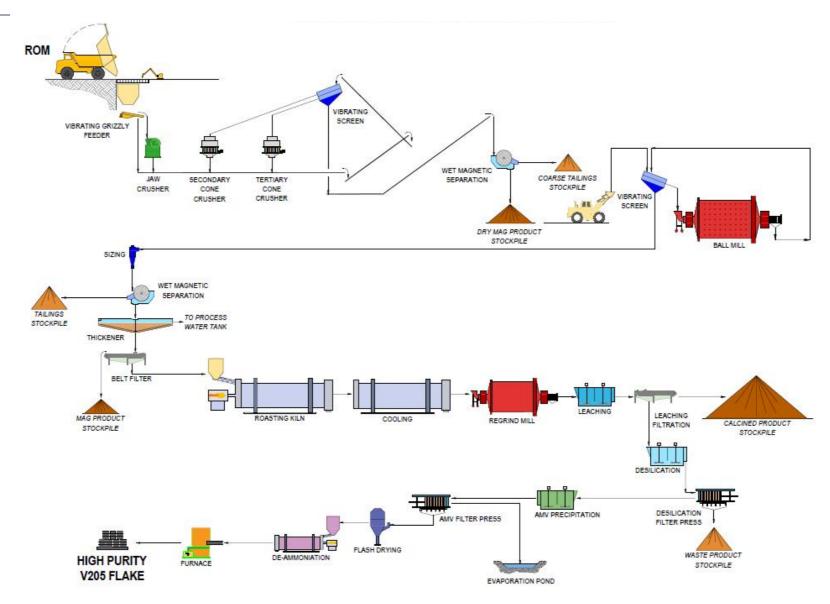






# Proposed Processing Flow Sheet

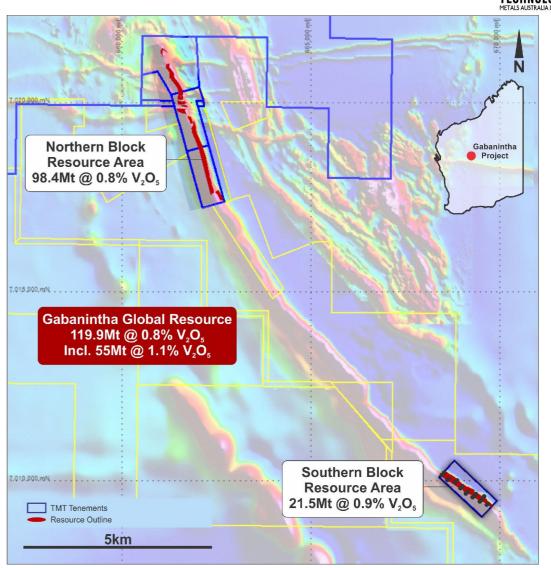




# Pre-feasibility Opportunities<sup>2</sup>



- Significant opportunities identified to enhance the PFS.
- Conversion of Inferred to Indicated Resources to materially increase mine life.
- Pit optimisations on the Northern Block show pit depth is limited by the resource; scope to increase designed open pit depths.
- Detailed geotechnical assessment is expected to deliver steeper pit walls, reducing strip ratio.
- Potential to further increase ore grind size with minimal impact on product recoveries.
- Scope to extract a saleable Co-Ni-Cu concentrate plus TiO<sub>2</sub> and high grade iron ore from tails streams.

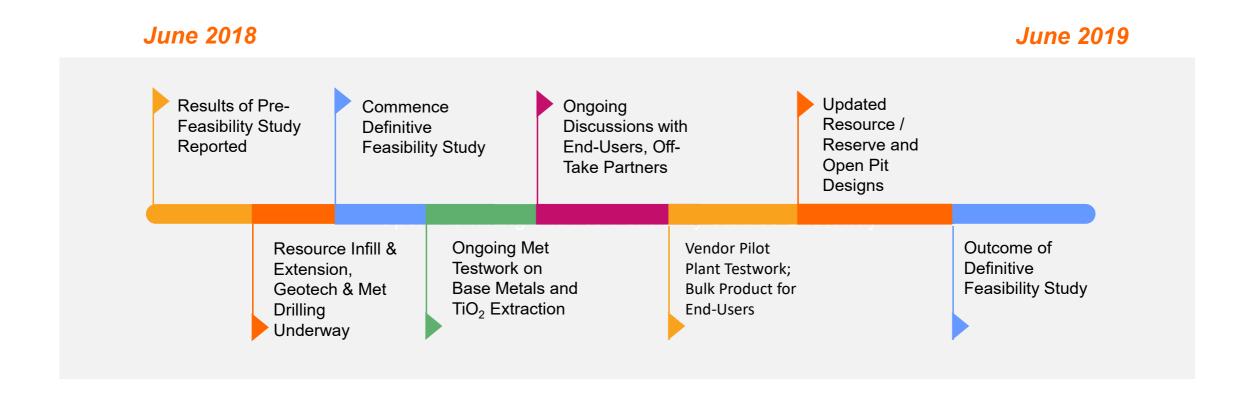


<sup>2 -</sup> Refer TMT ASX announcement dated 21 June 2018 for full details of the pre-feasibility study.

# Gabanintha Development Strategy



#### "Aggressive development timeline maintained"

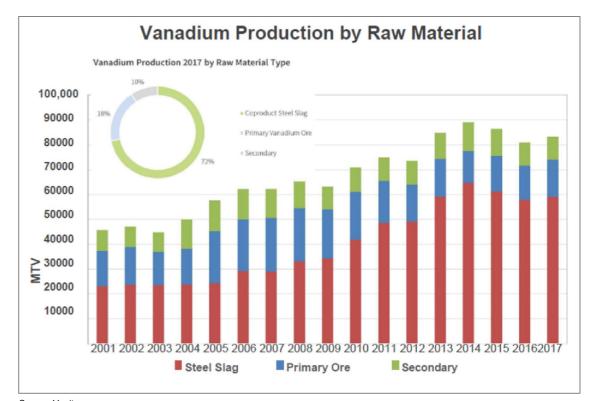




# Vanadium Supply Constraints

TECHNOLOGY METALS AUSTRALIA LIMITED

- Structural change in industry has seen consumption outstrip supply since 2010.
- Global industry rationalisation, strict environmental regulations in China and limited new supply resulting in a production decline.
- Ban on slag imports to China implemented 1 January
   2018 amidst shutdowns of Chinese plants.
- Annual global production in 2017 (~83,200t V metal) made up of steel slag co-product (72%), primary ores (18%) and 10% from secondary.
- China was largest producer at 57% of supply, followed by Russia and South Africa.

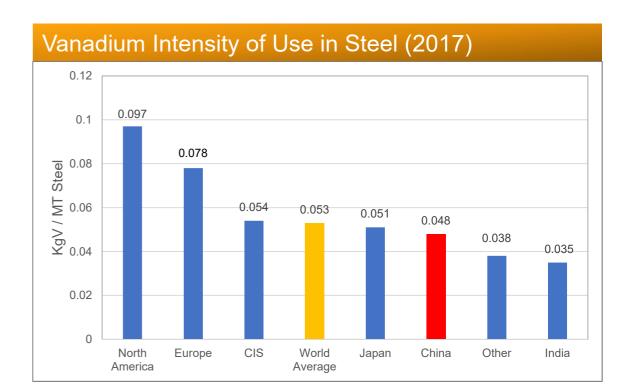


Source: Vanitec

# Vanadium Consumption Increasing



- Consumption in 2017 (~85,800t V metal) dominated by steel alloys (86%) with chemical industry and energy storage at 9% and aeronautical at 5%.
- Global consumption dominated by China at 44% of 2017 use.
- Addition of 0.2% V content increases steel strength up to 100% and reduces weight for the same use by up to 30%.
- New Chinese Rebar standards will see intensity of use increasing from current 0.048kg/T steel towards European / USA levels – a potential 50% increase in Chinese consumption.
- Global consumption forecast to increase to 113,000t (~202,000t V2O5 equivalent) by 2021 (Merchant Research & Consulting).

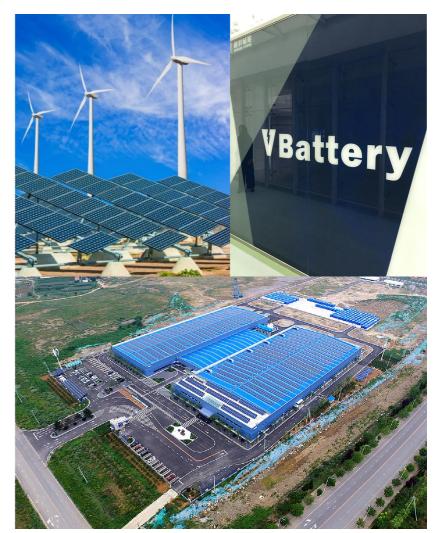


Source: TTP Squared

# Market Disrupter – VRB's



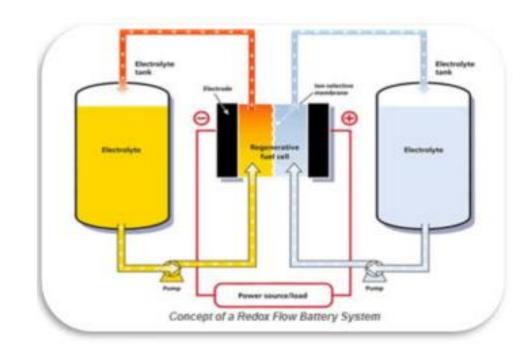
- Vanadium Redox Batteries (VRB's) provide an efficient storage and re-supply solution for renewable energy, suitable for large-scale applications.
- VRB's are able to time-shift large amounts of previously generated energy for later use – balancing solar and wind intermittency.
- Vanadium ions in different oxidation states are used to store energy; battery capacity expandable by adding more storage tanks.
- VRB and chemical industry vanadium demand set to climb to 23,730t V metal by 2020.
- Rongke Power developing a 200MW/ 800MWh battery in Dalian, China, using  $^{\sim}6,960$  tonnes  $V_{2}O_{5}$ .



# Advantages of VRB's



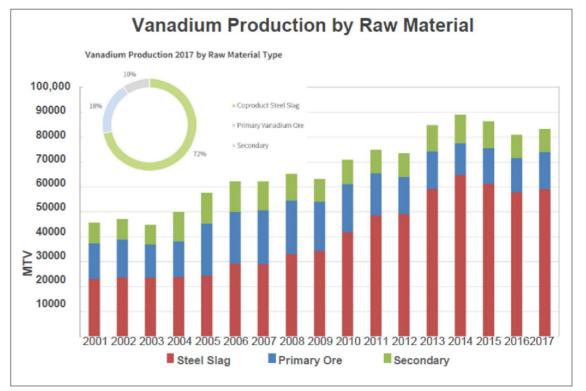
- Lifespan of +20 years with very high cycle life (up to 20,000 cycles) and no capacity loss.
- Rapid recharge and discharge, with very fast response time (<70ms).</li>
- Can discharge to 100% with no performance degradation with excellent long term charge retention.
- Only one battery element vanadium is anode and cathode unique among flow batteries.
- Easily scalable into large MW applications; provide a grid scale solution – peak shaving, regulating load frequency, driving grid efficiency.
- Suitable for micro grids for remote communities, mine sites, islands etc.
- Improved safety (non-flammable) compared to Li-ion batteries.



### Vanadium Market in Deficit



- Shortfall of ~2,600t V metal in 2017, with World (ex China) consumption outstripping supply since 2006.
- Chinese production constraints impacting on Chinese exports ability to plug global supply gap.
- Results in disparity between Chinese and European pricing<sup>1</sup>:
  - **CHINA** US\$18.30 18.65/lb
  - **EUROPE** US\$18.50 19.00/lb
- Global deficit forecast to increase to ~28,500t  $V_2O_5$  in 2021 and ~39,300t  $V_2O_5$  in 2023 (Merchant Research & Consulting).
- Emerging primary producers ideally placed to meet increasing demand.



Source: Vanitec

1 - Source: FerroAlloyNet, 12 July 2018.

### Summary

- Pre-feasibility study confirms the robust technical and financial viability of Gabanintha.
- Conventional salt roast / water leach processing and excavate, load and haul open pit mining.
- **Significant project upside** identified through PFS.
- Stable well resourced mining environment with excellent infrastructure and access to services.
- Technical expertise in place to progress to Definitive Feasibility Stage of the Project.
- Experienced Board focused on delivering shareholder returns.











### Global Mineral Resource<sup>3</sup>



- Overall global resource of 119.9Mt at 0.8% V<sub>2</sub>O<sub>5</sub> split between 98.4Mt at 0.8% V<sub>2</sub>O<sub>5</sub> in the Northern Block and 21.5Mt at 0.9% V<sub>2</sub>O<sub>5</sub> in the Southern Tenement.
- One of the highest grade deposits in the World, with exceptional high grade resources of **55.0Mt at 1.1%**  $V_2O_5$  within consistent basal massive magnetite.
- Probable Reserve of 16.7Mt at 0.96%  $V_2O_5$  contained within Indicated Resource of 21.6Mt at 0.9%  $V_2O_5$  (Northern Block only includes a high grade component of 14.5Mt at 1.1%  $V_2O_5$ ).
- Scope identified to materially increase the Indicated Resource within an expanded global resource.

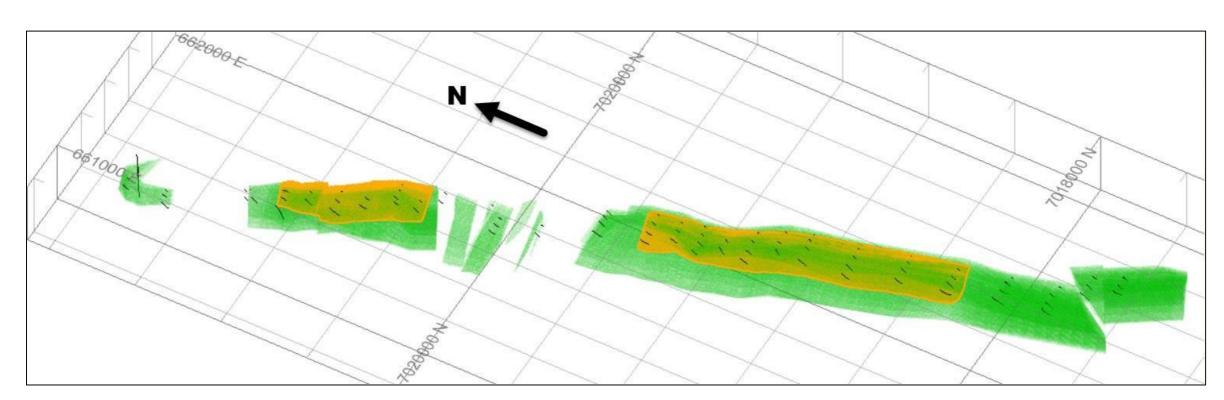
Technology Metals Gabanintha Vanadium Project - Global Mineral Resources as at March 2018										
Material	Classification	Tonnage (Mt)	V2O5%	Fe%	Al2O3%	SiO2%	TiO2%	LOI%	Р%	S%
Massive magnetite	Indicated	14.5	1.1	49.2	5.1	5.8	12.8	-0.2	0.007	0.2
	Inferred	40.5	1.1	48.3	5.5	6.5	12.7	0.2	0.007	0.2
	Indicated + Inferred	55.0	1.1	48.5	5.4	6.3	12.7	0.1	0.007	0.2
Disseminated magnetite	Indicated	7.1	0.6	29.9	12.6	24.4	7.8	2.9	0.032	0.1
	Inferred	57.7	0.6	27.2	13.7	26.7	7.2	4.0	0.024	0.2
	Indicated + Inferred	64.9	0.6	27.5	13.5	26.4	7.2	3.9	0.025	0.2
Combined	Indicated + Inferred	119.9	0.8	37.1	9.8	17.2	9.7	2.1	0.016	0.2

<sup>\*</sup> Note: The Mineral Resource was estimated within constraining wireframe solids using a nominal 0.9% V2O5 lower cut-off for the Massive magnetite zone and using a nominal 0.4% V2O5 lower cut-off for the banded and disseminated mineralisation zones. The Mineral Resource is quoted from all classified blocks within these wireframe solids above a lower cut-off grade of 0.4% V2O5. Differences may occur due to rounding.

3 - Refer TMT ASX announcements dated 13 June 2017, 18 December 2017 and 6 March 2018 for full details of the mineral resource estimation

### Northern Block Resource Classification

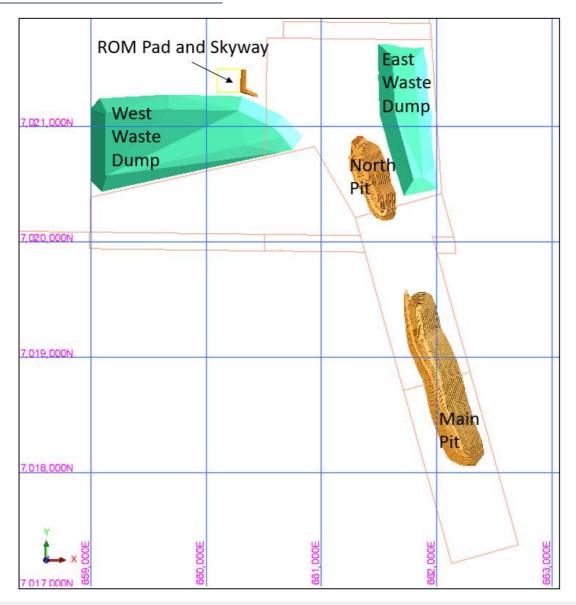




Oblique long section view towards 070° of classified model (Indicated – orange, Inferred – green)

# Gabanintha Proposed Site Layout

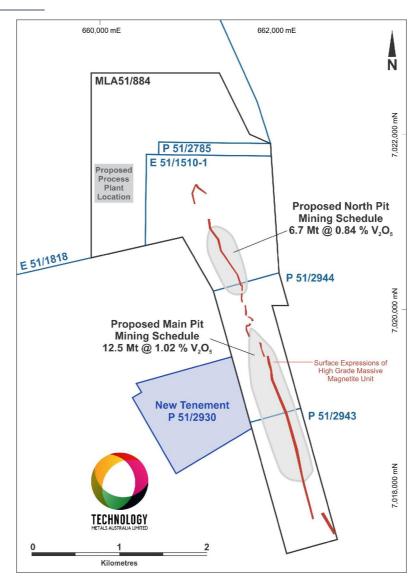




# Tenement Acquisition Provides Operational Flexibility<sup>4</sup>

TECHNOLOG)
METALS AUSTRALIA LIMITE

- Acquisition of strategic tenement adjacent to proposed main pit at the Northern Block.
- Enhances optionality and flexibility with regard to development of Gabanintha
- Compliments the robust findings of the recently completed Gabanintha Pre-Feasibility Study



4 – Refer TMT ASX announcement dated 4 July 2018 for full details of the tenement acquisition.

# Processing Facility Schematic





Gabanintha Project – Schematic Processing Plant Layout